Contents

Volume 198 1995

Review

Chow, D. C. and Forte, J. G.
Functional significance of the β-subunit for heterodimeric P-type ATPases 1–17

Hoegh-Guldberg, O. and Manahan, D. T.
Coulometric measurement of oxygen consumption during development of marine invertebrate embryos and larvae 19–30

Lessard, J., Val, A. L., Aota, S. and Randall, D. J.
Why is there no carbonic anhydrase activity available to fish plasma? 31–38

Ogawa, H., Kawakami, Z. and Yamaguchi, T.
Motor pattern of the stinging response in the honeybee *Apis mellifera* 39–47

Claireaux, G., Webber, D. M., Kerr, S. R. and Boutilier, R. G.
Physiology and behaviour of free-swimming Atlantic cod (*Gadus morhua*) facing fluctuating temperature conditions 49–60

Claireaux, G., Webber, D. M., Kerr, S. R. and Boutilier, R. G.
Physiology and behaviour of free-swimming Atlantic cod (*Gadus morhua*) facing fluctuating salinity and oxygenation conditions 61–69

Ro, A.-I. and Nilsson, D.-E.
Pupil adjustments in the eye of the common backswimmer 71–77

Gee, J. H. and Gee, P. A.
Aquatic surface respiration, buoyancy control and the evolution of air-breathing in gobies (Gobiidae: Pisces) 79–89

Martin, F. G. and Wolfersberger, M. G.
Bacillus thuringiensis δ-endotoxin and larval *Manduca sexta* midgut brush-border membrane vesicles act synergistically to cause very large increases in the conductance of planar lipid bilayers 91–96

Worden, M. K., Kravitz, E. A. and Goy, M. F.
Peptide F_1, an N-terminally extended analog of FMRFamide, enhances contractile activity in multiple target tissues in lobster 97–108

Skerrett, M., Peaire, A., Quigley, P. and Mercier, A. J.
Physiological effects of two FMRFamide-related peptides from the crayfish *Procambarus clarkii* 109–116

Toop, T., Donald, J. A. and Evans, D. H.
Localisation and characteristics of natriuretic peptide receptors in the gills of the Atlantic hagfish *Myxine glutinosa* (Agnatha) 117–126

Wright, P. A., Felskie, A. and Anderson, P. M.
Induction of ornithine–urea cycle enzymes and nitrogen metabolism and excretion in rainbow trout (*Oncorhynchus mykiss*) during early life stages 127–135

Harper, A. A., Newton, I. P. and Watt, P. W.
The effect of temperature on spontaneous action potential discharge of the isolated sinus venosus from winter and summer plaice (*Pleuronectes platessa*) 137–140

Beason, R. C., Dussourd, N. and Deutschlander, M. E.
Behavioural evidence for the use of magnetic material in magnetoreception by a migratory bird 141–146

Churchill, T. A. and Storey, K. B.
Metabolic effects of dehydration on an aquatic frog, *Rana pipiens* 147–154

Jensen, F. B.
Regulatory volume decrease in carp red blood cells: mechanisms and oxygenation-dependency of volume-activated potassium and amino acid transport 155–165

Novak, M. G., Ribeiro, J. M. C. and Hildebrand, J. G.
5-Hydroxytryptamine in the salivary glands of adult female *Aedes aegypti* and its role in regulation of salivation 167–174

Lancaster, W. C., Henson, O. W. and Keating, A. W.
Respiratory muscle activity in relation to vocalization in flying bats 175–191

Beddow, T. A. and Johnston, I. A.
Plasticity of muscle contractile properties following temperature acclimation in the marine fish *Myoxocephalus scorpius* 193–201

Beddow, T. A., van Leeuwen, J. L. and Johnston, I. A.
Swimming kinematics of fast starts are altered by temperature acclimation in the marine fish *Myoxocephalus scorpius* 203–208

Bonser, R. H. C.
Longitudinal variation in mechanical competence of bone along the avian humerus 209–212

Walsberg, G. E. and Wolf, B. O.
Variation in the respiratory quotient of birds and implications for indirect calorimetry using measurements of carbon dioxide production 213–219

Pabst, D. A., Rommel, S. A., McLellan, W. A., Williams, T. M. and Rowles, T. K.
Thermoregulation of the intra-abdominal testes of the bottlenose dolphin (*Tursiops truncatus*) during exercise 221–226

Croghan, P. C., Noble-Nesbitt, J. and Appel, A. G.
Measurement of water and carbon dioxide loss from insects using radioactive isotopes 227–233

Noble-Nesbitt, J., Appel, A. G. and Croghan, P. C.
Water and carbon dioxide loss from the cockroach *Periplaneta americana* (L.) measured using radioactive isotopes 235–240

Booth, D. T.
Oxygen availability and embryonic development in sand snail (*Polinices sordidus*) egg masses 241–247

Smith, J. J. B., Machin, J. and Lampert, G. J.
An electrical model for *Periplaneta americana* pronotal integument: an epidermal location for hydration-dependent resistance 249–261

Christie, A. E., Baldwin, D., Turrigiano, G., Graubard, K. and Marder, E.
Immunocytochemical localization of multiple cholecystokinin-like peptides in the stomastogastric nervous system of the crab *Cancer borealis* 263–271

Review

Wright, P. A.
Nitrogen excretion: three end products, many physiological roles 273–281

Stamhuis, E. J. and Videler, J. J.
Quantitative flow analysis around aquatic animals using laser sheet particle image velocimetry 283–294

Postlethwaite, E. K. and McDonald, D. G.
Mechanisms of Na^+ and Cl^- regulation in freshwater-adapted rainbow trout (*Oncorhynchus mykiss*) during exercise and stress 295–304

Val, A. L., Lessard, J. and Randall, D. J.
Effects of hypoxia on rainbow trout (*Oncorhynchus mykiss*): intraerythrocytic phosphates 305–310

Thoroed, S. M., Soergaard, M., Cragoe, E. J. and Fugelli, K.
The osmolality-sensitive taurine channel in flounder erythrocytes is strongly stimulated by noradrenaline under hypo-osmotic conditions 311–324

Vos Hzn, J. J., Coemans, M. A. J. M. and Nuboer, J. F. W.
No evidence for polarization sensitivity in the pigeon electroretinogram 325–335

Hogstrand, C., Reid, S. D. and Wood, C. M.
Ca^{2+} *versus* Zn^{2+} transport in the gills of freshwater rainbow trout and the cost of adaptation to waterborne Zn^{2+} 337–348

Piller, S. C., Henry, R. P., Doeller, J. E. and Kraus, D. W.
A comparison of the gill physiology of two euryhaline crab species, *Callinectes sapidus* and *Callinectes similis*: energy production, transport-related enzymes and osmoregulation as a function of acclimation salinity 349–358

Dall'Antonia, L., Dall'Antonia, P., Benvenuti, S., Ioalè, P., Massa, B. and Bonadonna, F.
The homing behaviour of Cory's shearwaters (*Calonectris diomedea*) studied by means of a direction recorder 359–362

Blumberg-Feldman, H. and Eilam, D.
Postnatal development of synchronous stepping in the gerbil (*Gerbillus dasyurus*) 363–372

Wray, S. and Wilkie, D. R.
The relationship between plasma urea levels and some muscle trimethylamine levels in *Xenopus laevis*: a ^{31}P and ^{14}N nuclear magnetic resonance study 373–378

Willems, P. A., Cavagna, G. A. and Heglund, N. C.
External, internal and total work in human locomotion 379–393

Ellis, B. A. and Morris, S.
Effects of extreme pH on the physiology of the Australian 'yabby' *Cherax destructor*: acute and chronic changes in haemolymph carbon dioxide, acid–base and ionic status 395–407

Ellis, B. A. and Morris, S.
Effects of extreme pH on the physiology of the Australian 'yabby' *Cherax destructor*: acute and chronic changes in haemolymph oxygen levels, oxygen consumption and metabolite levels 409–418

Richard, B. A. and Wainwright, P. C.
Scaling the feeding mechanism of largemouth bass (*Micropterus salmoides*): kinematics of prey capture 419–433

Büschges, A., Schmitz, J. and Bässler, U.
Rhythmic patterns in the thoracic nerve cord of the stick insect induced by pilocarpine 435–456

Gray, L. A. and Nishikawa, K. C.
Feeding kinematics of phyllomedusine tree frogs 457–463

Neufeld, D. S. and Wright, S. H.
Basolateral transport of taurine in epithelial cells of isolated, perfused *Mytilus californianus* gills 465–473

Waters, D. A. and Jones, G.
Echolocation call structure and intensity in five species of insectivorous bats 475–489

James, R. S., Altringham, J. D. and Goldspink, D. F.
The mechanical properties of fast and slow skeletal muscles of the mouse in relation to their locomotory function 491–502

James, R. S., Young, I. S. and Altringham, J. D.
The effect of tendon compliance on *in vitro*/*in vivo* estimations of sarcomere length 503–506

Kalogianni, E. and Theophilidis, G.
The motor innervation of the oviducts and central generation of the oviductal contractions in two orthopteran species (*Calliptamus* sp. and *Decticus albifrons*) 507–520

Lighton, J. R. B. and Berrigan, D.
Questioning paradigms: caste-specific ventilation in harvester ants, *Messor pergandei* and *M. julianus* (Hymenoptera: Formicidae) 521–530

Harrison, P. J., Macmillan, D. L. and Young, H. M.
Serotonin immunoreactivity in the ventral nerve cord of the primitive crustacean *Anaspides tasmaniae* closely resembles that of crayfish 531–535

Simmons, P. J.
The transfer of signals from photoreceptor cells to large second-order neurones in the ocellar visual system of the locust *Locusta migratoria* 537–549

Lin, J.-J. and Somero, G. N.
Thermal adaptation of cytoplasmic malate dehydrogenases of eastern Pacific barracuda (*Sphyraena* spp): the role of differential isoenzyme expression 551–560

Haim, A., McDevitt, R. M. and Speakman, J. R.
Daily variations in the response of wood mice *Apodemus sylvaticus* to noradrenaline 561–565

Whiteley, N. M., Naylor, J. K. and Taylor, E. W.
Extracellular and intracellular acid–base status in the freshwater crayfish *Austropotamobius pallipes* between 1 and 12 °C 567–576

Tiihonen, K., Nikinmaa, M. and Lappivaara, J.
Glucose transport in carp erythrocytes: individual variation and effects of osmotic swelling, extracellular pH and catecholamines 577–583

Jayne, B. C. and Lauder, G. V.
Speed effects on midline kinematics during steady undulatory swimming of largemouth bass, *Micropterus salmoides* 585–602

Kloppenburg, P. and Hildebrand, J. G.
Neuromodulation by 5-hydroxytryptamine in the antennal lobe of the sphinx moth *Manduca sexta* 603–611

Mercer, A. R., Hayashi, J. H. and Hildebrand, J. G.
Modulatory effects of 5-hydroxytryptamine on voltage-activated currents in cultured antennal lobe neurones of the sphinx moth *Manduca sexta* 613–627

Langman, V. A., Roberts, T. J., Black, J., Maloiy, G. M. O., Heglund, N. C., Weber, J.-M., Kram, R. and Taylor, C. R.
Moving cheaply: energetics of walking in the African elephant 629–632

Qin, X. and Waite, J. H.
Exotic collagen gradients in the byssus of the mussel *Mytilus edulis* 633–644

Shingyoji, C., Yoshimura, K., Eshel, D., Takahashi, K. and Gibbons, I. R.
Effect of beat frequency on the velocity of microtubule sliding in reactivated sea urchin sperm flagella under imposed head vibration 645–653

Clare, A. S., Thomas, R. F. and Rittschof, D.
Evidence for the involvement of cyclic AMP in the pheromonal modulation of barnacle settlement 655–664

Ullén, F., Deliagina, T. G., Orlovsky, G. N. and Grillner, S.
Spatial orientation in the lamprey. I. Control of pitch and roll 665–673

Ullén, F., Deliagina, T. G., Orlovsky, G. N. and Grillner, S.
Spatial orientation in the lamprey. II. Visual influence on orientation during locomotion and in the attached state 675–681

Jamon, M. and Clarac, F.
Locomotor patterns in freely moving crayfish (*Procambarus clarkii*) 683–700

Reilly, S. M.
The ontogeny of aquatic feeding behavior in *Salamandra salamandra*: stereotypy and isometry in feeding kinematics 701–708

Gillis, G. B. and Lauder, G. V.
Kinematics of feeding in bluegill sunfish: is there a general distinction between aquatic capture and transport behaviors? 709–720

Dambach, M. and Gras, A.
Bioacoustics of a miniature cricket, *Cycloptiloides canariensis* (Orthoptera: Gryllidae: Mogoplistinae) 721–728

Yoshida, M. and Kobayashi, M.
Modulation of the buccal muscle contraction by identified serotonergic and peptidergic neurons in the snail *Achatina fulica* 729–738

Conley, K. E., Christian, K. A., Hoppeler, H. and Weibel, E. R.
Heart mitochondrial properties and aerobic capacity are similarly related in a mammal and a reptile 739–746

Bjerselius, R., Olsén, K. H. and Zheng, W.
Behavioural and endocrinological responses of mature male goldfish to the sex pheromone 17α,20β-dihydroxy-4-pregnen-3-one in the water 747–754

Anderson, P. M. and Walsh, P. J.
Subcellular localization and biochemical properties of the enzymes of carbamoyl phosphate and urea synthesis in the batrachoidid fishes *Opsanus beta*, *Opsanus tau* and *Porichthys notatus* 755–766

Onken, H. and Putzenlechner, M.
A V-ATPase drives active, electrogenic and Na^+-independent Cl^- absorption across the gills of *Eriocheir sinensis* 767–774

Tucker, V. A.
Drag reduction by wing tip slots in a gliding Harris' hawk, *Parabuteo unicinctus* 775–781

Postner, M. and Kramer, B.
Electrosensory thresholds in larvae of the weakly electric fish *Pollimyrus isidori* (Mormyridae, Teleostei) during ontogeny 783–791

Patel, M., Hayes, T. K. and Coast, G. M.
Evidence for the hormonal function of a CRF-related diuretic peptide (*Locusta*-DP) in *Locusta migratoria* 793–804

Jayne, B. C. and Lauder, G. V.
Are muscle fibers within fish myotomes activated synchronously? Patterns of recruitment within deep myomeric musculature during swimming in largemouth bass 805–815

Cho, K. and McFarlane, I. D.
A method for recording electrical activity from the body wall nerve nets in sea anemones 817–820

Elphick, M. R., Rayne, R. C., Riveros-Moreno, V., Moncada, S. and O'Shea, M.
Nitric oxide synthesis in locust olfactory interneurones 821–829

Wang, X. T. and Ker, R. F.
Creep rupture of wallaby tail tendons 831–845

Wang, X. T., Ker, R. F. and Alexander, R. McN.
Fatigue rupture of wallaby tail tendons 847–852

Johansson, D., Nilsson, G. E. and Törnblom, E.
Effects of anoxia on energy metabolism in crucian carp brain slices studied with microcalorimetry 853–859

Wilcox, S. J. and Dietz, T. H.
Potassium transport in the freshwater bivalve *Dreissena polymorpha* 861–868

Lorez, M.
Neural control of hindleg steering in flight in the locust 869–875

Soengas, J. L. and Moon, T. W.
Uptake and metabolism of glucose, alanine and lactate by red blood cells of the American eel *Anguilla rostrata* 877–888

Bai, D. and Sattelle, D. B.
A $GABA_B$ receptor on an identified insect motor neurone 889–894

Satterlie, R. A., Norekian, T. P., Jordan, S. and Kazilek, C. J.
Serotonin modulation of swimming speed in the pteropod mollusc *Clione limacina*. I. Serotonin immunoreactivity in the central nervous system and wings 895–904

Satterlie, R. A.
Serotonergic modulation of swimming speed in the pteropod mollusc *Clione limacina*. II. Peripheral modulatory neurons 905–916

Satterlie, R. A. and Norekian, T. P.
Serotonergic modulation of swimming speed in the pteropcd mollusc *Clione limacina*. III. Cerebral neurons 917–930

Harris, M. B. and Milsom, W. K.
Parasympathetic influence on heart rate in euthermic and hibernating ground squirrels 931–937

Garstang, M., Larom, D., Raspet, R. and Lindeque, M.
Atmospheric controls on elephant communication 939–951

Sørensen, B. and Weber, R. E.
Effects of oxygenation and the stress hormones adrenaline and cortisol on the viscosity of blood from the trout *Oncorhynchus mykiss* 953–959

Sacchi, V. F., Perego, C. and Magagnin, S.
Functional characterization of leucine transport induced in *Xenopus laevis* oocytes injected with mRNA isolated from midguts of lepidopteran larvae (*Philosamia cynthia*) 961–966

Stiffler, D. F.
Active calcium transport in the skin of the frog *Rana pipiens*: kinetics and seasonal rhythms 967–974

Guimaraes, A. C., Herzog, W., Allinger, T. L. and Zhang, Y. T.
The EMG–force relationship of the cat soleus muscle and its association with contractile conditions during locomotion 975–987

Weinstein, R. B.
Locomotor behavior of nocturnal ghost crabs on the beach: focal animal sampling and instantaneous velocity from three-dimensional motion analysis 989–999

Young, D. and Bennet-Clark, H. C.
The role of the tymbal in cicada sound production 1001–1019

Chaen, S., Inoue, J. and Sugi, H.
The force–velocity relationship of ATP-dependent actin–myosin sliding causing cytoplasmic streaming in algal cells, studied using a centrifuge microscope 1021–1027

Bonser, R. H. C. and Purslow, P. P.
The Young's modulus of feather keratin 1029–1033

Layland, J., Young, I. S. and Altringham, J. D.
The effect of cycle frequency on the power output of rat papillary muscles *in vitro* 1035–1043

Hudman, D. and McFarlane, I. D.
The role of L-Dopa in the nervous system of sea anemones: a putative inhibitory transmitter in tentacles 1045–1050

Camhi, J. M., Sumbre, G. and Wendler, G.
Wing-beat coupling between flying locust pairs: preferred phase and lift enhancement 1051–1063

Dudley, R.
Extraordinary flight performance of orchid bees (Apidae: Euglossini) hovering in heliox (80% He/20% O_2) 1065–1070

Gomi, T., Okuda, T. and Tanaka, S.
Protein synthesis and degradation in flight muscles of adult crickets (*Gryllus bimaculatus*) 1071–1077

Lohmann, K. J., Swartz, A. W. and Lohmann, C. M. F.
Perception of ocean wave direction by sea turtles 1079–1085

Mulye, H. and Davey, K. G.
The feeding stimulus in *Rhodnius prolixus* is transmitted to the brain by a humoral factor 1087–1092

Nussenzveig, R. H., Bentley, D. L. and Ribeiro, J. M. C.
Nitric oxide loading of the salivary nitric-oxide-carrying hemoproteins (nitrophorins) in the blood-sucking bug *Rhodnius prolixus* 1093–1098

Trimarchi, J. R. and Schneiderman, A. M.
Different neural pathways coordinate *Drosophila* flight initiations evoked by visual and olfactory stimuli 1099–1104

Crockett, E. L. and Hazel, J. R.
Cholesterol levels explain inverse compensation of membrane order in brush border but not homeoviscous adaptation in basolateral membranes from the intestinal epithelia of rainbow trout 1105–1113

Wilson, R. P., Pütz, K., Grémillet, D., Culik, B. M., Kierspel, M., Regel, J., Bost, C. A., Lage, J. and Cooper, J.
Reliability of stomach temperature changes in determining feeding characteristics of seabirds 1115–1135

Butt, A. G. and Taylor, H. H.
Regulatory responses of the coxal organs and the anal excretory system to dehydration and feeding in the spider *Porrhothele antipodiana* (Mygalomorpha: Dipluridae) 1137–1149

Nilsson, G. E., Löfman, C. O. and Block, M.
Extensive erythrocyte deformation in fish gills observed by *in vivo* microscopy: apparent adaptations for enhancing oxygen uptake 1151–1156

Preuss, T. and Budelmann, B. U.
A dorsal light reflex in a squid 1157–1159

Wainwright, P. C. and Richard, B. A.
Scaling the feeding mechanism of the largemouth bass (*Micropterus salmoides*): motor pattern 1161–1171

Gibb, A. C.
Kinematics of prey capture in a flatfish, *Pleuronichthys verticalis* 1173–1183

Anderson, B. D., Shultz, J. W. and Jayne, B. C.
Axial kinematics and muscle activity during terrestrial locomotion of the centipede *Scolopendra heros* 1185–1195

MacFarlane, R. B. and Bowers, M. J.
Matrotrophic viviparity in the yellowtail rockfish *Sebastes flavidus* 1197–1206

Zhuang, Z., Duerr, J. M. and Ahearn, G. A.
Ca^{2+} and Zn^{2+} are transported by the electrogenic $2Na^{+}/1H^{+}$ antiporter in echinoderm gastrointestinal epithelium 1207–1217

Ennos, A. R., Hickson, J. R. E. and Roberts, A.
Functional morphology of the vanes of the flight feathers of the pigeon *Columba livia* 1219–1228

Morgan, I. J. and Potts, W. T. W.
The effects of thiocyanate on the intracellular ion concentrations of branchial epithelial cells of brown trout 1229–1232

Review

Neely, M. D. and Nicholls, J. G.
Electrical activity, growth cone motility and the cytoskeleton 1433–1446

Garfias, A., Rodríguez-Sosa, L. and Aréchiga, H.
Modulation of crayfish retinal function by red pigment concentrating hormone 1447–1454

Graham, J. B., Lai, N. C., Chiller, D. and Roberts, J. L.
The transition to air breathing in fishes. V. Comparative aspects of cardiorespiratory regulation in *Synbranchus marmoratus* and *Monopterus albus* (Synbranchidae) 1455–1467

Woolley, D. M. and Bozkurt, H. H.
The distal sperm flagellum: its potential for motility after separation from the basal structures 1469–1481

Chrachri, A.
Ionic currents in identified swimmeret motor neurones of the crayfish *Pacifastacus leniusculus* 1483–1492

Pelletier, D., Blier, P. U., Dutil, J.-D. and Guderley, H.
How should enzyme activities be used in fish growth studies? 1493–1497

Walsberg, G. E. and Wolf, B. O.
Effects of solar radiation and wind speed on metabolic heat production by two mammals with contrasting coat colours 1499–1507

Hofmann, G. E. and Somero, G. N.
Evidence for protein damage at environmental temperatures: seasonal changes in levels of ubiquitin conjugates and hsp70 in the intertidal mussel *Mytilus trossulus* 1509–1518

Valenzuela, J. G., Walker, F. A. and Ribeiro, J. M. C.
A salivary nitrophorin (nitric-oxide-carrying hemoprotein) in the bedbug *Cimex lectularius* 1519–1526

McLister, J. D., Stevens, E. D. and Bogart, J. P.
Comparative contractile dynamics of calling and locomotor muscles in three hylid frogs 1527–1538

Sinakevitch, I. G., Geffard, M., Pelhate, M. and Lapied, B.
Octopaminergic dorsal unpaired median (DUM) neurones innervating the colleterial glands of the female cockroach *Periplaneta americana* 1539–1544

Wood, C. M., Pärt, P. and Wright, P. A.
Ammonia and urea metabolism in relation to gill function and acid–base balance in a marine elasmobranch, the spiny dogfish (*Squalus acanthias*) 1545–1558

Walsh, P. J. and Milligan, C. L.
Effects of feeding and confinement on nitrogen metabolism and excretion in the gulf toadfish *Opsanus beta* 1559–1566

Aigeldinger, T. L. and Fish, F. E.
Hydroplaning by ducklings: overcoming limitations to swimming at the water surface 1567–1574

Jayne, B. C. and Lauder, G. V.
Red muscle motor patterns during steady swimming in largemouth bass: effects of speed and correlations with axial kinematics 1575–1587

Kuenzi, F. and Burrows, M.
Central connections of sensory neurones from a hair plate proprioceptor in the thoraco-coxal joint of the locust 1589–1601

Ennion, S., Gauvry, L., Butterworth, P. and Goldspink, G.
Small-diameter white myotomal muscle fibres associated with growth hyperplasia in the carp (*Cyprinus carpio*) express a distinct myosin heavy chain gene 1603–1611

Lighton, J. R. B. and Garrigan, D.
Ant breathing: testing regulation and mechanism hypotheses with hypoxia 1613–1620

Buck, L. T. and Bickler, P. E.
Role of adenosine in NMDA receptor modulation in the cerebral cortex of an anoxia-tolerant turtle (*Chrysemys picta belli*) 1621–1628

Review

Wardle, C. S., Videler, J. J. and Altringham, J. D.
Tuning in to fish swimming waves: body form, swimming mode and muscle function 1629–1636

Zollikofer, C. P. E., Wehner, R. and Fukushi, T.
Optical scaling in conspecific *Cataglyphis* ants 1637–1646

O'Donnell, M. J. and Maddrell, S. H. P.
Fluid reabsorption and ion transport by the lower Malpighian tubules of adult female *Drosophila* 1647–1653

van den Berg, C. and Rayner, J. M. V.
The moment of inertia of bird wings and the inertial power requirement for flapping flight 1655–1664

Stevenson, R. D., Corbo, K., Baca, L. B. and Quang, D. Le
Cage size and flight speed of the tobacco hawkmoth *Manduca sexta* 1665–1672

Matheson, T. and Field, L. H.
An elaborate tension receptor system highlights sensory complexity in the hind leg of the locust 1673–1689

Adamo, S. A., Linn, C. E. and Hoy, R. R.
The role of neurohormonal octopamine during 'fight or flight' behaviour in the field cricket *Gryllus bimaculatus* 1691–1700

Ocker, W.-G. Hedwig, B. and Elsner, N.
Application of putative neurotransmitters elicits and modulates stridulation in two species of acridid grasshoppers 1701–1710

Heming, T. A., Traber, D. L., Hinder, F. and Bidani, A.
Effects of bafilomycin A_1 on cytosolic pH of sheep alveolar and peritoneal macrophages: evaluation of the pH-regulatory role of plasma membrane V-ATPases 1711–1715

Wells, M. J. and Wells, J.
The control of ventilatory and cardiac responses to changes in ambient oxygen tension and oxygen demand in octopus 1717–1727

Wood, C. M., Hopkins, T. E., Hogstrand, C. and Walsh, P. J.
Pulsatile urea excretion in the ureagenic toadfish *Opsanus beta*: an analysis of rates and routes 1729–1741

Wedemeyer, H. and Schild, D.
Chemosensitivity of the osphradium of the pond snail *Lymnaea stagnalis* 1743–1754

Harrison, J. F., Hadley, N. F. and Quinlan, M. C.
Acid–base status and spiracular control during discontinuous ventilation in grasshoppers 1755–1763

Daló, N. L., Hackman, J. C., Storey, K. and Davidoff, R. A.
Changes in motoneuron membrane potential and reflex activity induced by sudden cooling of isolated spinal cords: differences among cold-sensitive, cold-resistant and freeze-tolerant amphibian species 1765–1774

Golding, E. M., Teague, W. E. and Dobson, G. P.
Adjustment of K' to varying pH and pMg for the creatine kinase, adenylate kinase and ATP hydrolysis equilibria permitting quantitative bioenergetic assessment 1775–1782

Hopkins, S. R., Hicks, J. W., Cooper, T. K. and Powell, F. L.
Ventilation and pulmonary gas exchange during exercise in the savannah monitor lizard (*Varanus exanthematicus*) 1783–1789

Welborn, J. R. and Manahan, D. T.
Taurine metabolism in larvae of marine invertebrate molluscs (Bilvalvia, Gastropoda) 1791–1799

Lecklin, T., Nash, G. B. and Egginton, S.
Do fish acclimated to low temperature improve microcirculatory perfusion by adapting red cell rheology? 1801–1808

Shirakawa, I., Oiwa, K., Chaen, S., Shimizu, T., Tanaka, H. and Sugi, H.
The mode of ATP-dependent microtubule–kinesin sliding in the auxotonic condition 1809–1815

Michelsen, A. and Rohrseitz, K.
Directional sound processing and interaural sound transmission in a small and a large grasshopper 1817–1827

Biewener, A. A. and Baudinette, R. V.
In vivo muscle force and elastic energy storage during steady-speed hopping of tammar wallabies (*Macropus eugenii*) 1829–1841

Millar, N. S., Baylis, H. A., Reaper, C., Bunting, R., Mason, W. T. and Sattelle, D. B.
Functional expression of a cloned *Drosophila* muscarinic acetylcholine receptor in a stable *Drosophila* cell line 1843–1850

Johnston, I. A., Van Leeuwen, J. L., Davies, M. L. F. and Beddow, T.
How fish power predation fast-starts 1851–1861

Frith, H. R. and Blake, R. W.
The mechanical power output and hydromechanical efficiency of northern pike (*Esox lucius*) fast-starts 1863–1873

Toop, T., Donald, J. A. and Evans, D. H.
Natriuretic peptide receptors in the kidney and the ventral and dorsal aortae of the Atlantic hagfish *Myxine glutinosa* (Agnatha) 1875–1882

Kültz, D. and Somero, G. N.
Osmotic and thermal effects on *in situ* ATPase activity in permeabilized gill epithelial cells of the fish *Gillichthys mirabilis* 1883–1894

Tauber, E. and Camhi, J. M.
The wind-evoked escape behavior of the cricket *Gryllus bimaculatus*: integration of behavioral elements 1895–1907

Cutler, D. E., Bennett, R. R., Stevenson, R. D. and White, R. H.
Feeding behavior in the nocturnal moth *Manduca sexta* is mediated mainly by blue receptors, but where are they located in the retina? 1909–1917

Small, D. L. and Morris, C. E.
Pore properties of *Lymnaea stagnalis* neuron stretch-activated K^+ channels 1919–1929

Brackenbury, J. and Wang, R.
Ballistics and visual targeting in flea-beetles (Alticinae) 1931–1942

Schneider, T.
Distribution of 2-[^{125}I]iodomelatonin binding sites in the brain of the pied flycatcher (*Ficedula hypoleuca*) and the zebra finch (*Taeniopygia guttata*) 1943–1949

Trotter, J. A. and Koob, T. J.
Evidence that calcium-dependent cellular processes are involved in the stiffening response of holothurian dermis and that dermal cells contain an organic stiffening factor 1951–1961

Duch, C. and Pflüger, H. J.
Motor patterns for horizontal and upside-down walking and vertical climbing in the locust 1963–1976

Nowel, M. S., Shelton, P. M. J. and Stephen, R. O.
Functional organisation of the metathoracic femoral chordotonal organ in the cricket *Acheta domesticus* 1977–1988

Calabrese, B. and Pellegrino, M.
Remodelling of an intact neurone in the central nervous system of the leech 1989–1994

Böhm, H.
Dynamic properties of orientation to turbulent air current by walking carrion beetles 1995–2005

Chen, Q.-C., Cain, D. and Jen, P. H.-S.
Sound pressure transformation at the pinna of *Mus domesticus* 2007–2023

Ritter, D. and Nishikawa, K.
The kinematics and mechanism of prey capture in the African pig-nosed frog (*Hemisus marmoratum*): description of a radically divergent anuran tongue 2025–2040

Lohmann, K. J., Pentcheff, N. D., Nevitt, G. A., Stetten, G. D., Zimmer-Faust, R. K., Jarrard, H. E. and Boles, L. C.
Magnetic orientation of spiny lobsters in the ocean: experiments with undersea coil systems 2041–2048

Nevitt, G. A., Pentcheff, N. D., Lohmann, K. J. and Zimmer-Faust, R. K.
Evidence for hydrodynamic orientation by spiny lobsters in a patch reef environment 2049–2054

Dulin, M. F., Steffensen, I., Morris, C. E. and Walters, E. T.
Recovery of function, peripheral sensitization and sensory neurone activation by novel pathways following axonal injury in *Aplysia californica* 2055–2066

Steffensen, I., Dulin, M. F., Walters, E. T. and Morris, C. E.
Peripheral regeneration and central sprouting of sensory neurone axons in *Aplysia californica* following nerve injury 2067–2078

Hoeger, U., Dunn, J. F. and Märker, C.
Adenylate compartmentation and storage in coelomic cells of the polychaete *Nereis virens* 2079–2085

Marden, J. H.
Evolutionary adaptation of contractile performance in muscle of ectothermic winter-flying moths 2087–2094

Marden, J. H.
Large-scale changes in thermal sensitivity of flight performance during adult maturation in a dragonfly 2095–2102

Moffett, D. F., Koch, A. and Woods, R.
Electrophysiology of K^+ transport by midgut epithelium of lepidopteran insect larvae. III. Goblet valve patency 2103–2113

Koch, A. and Moffett, D. F.
Electrophysiology of K^+ transport by midgut epithelium of lepidopteran insect larvae. IV. A multicompartment model accounts for tetramethylammonium entry into goblet cavities 2115–2125

Poteser, M. and Kral, K.
Visual distance discrimination between stationary targets in praying mantis: an index of the use of motion parallax 2127–2137

Stephen, R. O. and Hartley, J. C.
Sound production in crickets 2139–2152

Bishop, C. M. and Butler, P. J.
Physiological modelling of oxygen consumption in birds during flight 2153–2163

Johnson, T. P. and Bennett, A. F.
The thermal acclimation of burst escape performance in fish: an integrated study of molecular and cellular physiology and organismal performance 2165–2175

Li, J., Eygensteyn, J., Lock, R. A. C., Verbost, P. M., van der Heijden, A. J. H., Wendelaar Bonga, S. E. and Flik, G.
Branchial chloride cells in larvae and juveniles of freshwater tilapia *Oreochromis mossambicus* 2177–2184

Davison, I. G., Wright, G. M. and DeMont, M. E.
The structure and physical properties of invertebrate and primitive vertebrate arteries 2185–2196

Galli, A., DeFelice, L. J., Duke, B.-J., Moore, K. R. and Blakely, R. D.
Sodium-dependent norepinephrine-induced currents in norepinephrine-transporter-transfected HEK-293 cells blocked by cocaine and antidepressants 2197–2212

Beaumont, M. W., Butler, P. J. and Taylor, E. W.
Plasma ammonia concentration in brown trout in soft acidic water and its relationship to decreased swimming performance 2213–2220

Syme, D. A. and Josephson, R. K.
Influence of muscle length on work from trabecular muscle of frog atrium and ventricle 2221–2227

Hopkins, T. E., Wood, C. M. and Walsh, P. J.
Interactions of cortisol and nitrogen metabolism in the ureogenic gulf toadfish *Opsanus beta* 2229–2235

Jensen, F. B. and Brahm, J.
Kinetics of chloride transport across fish red blood cell membranes 2237–2244

de la Cueva Salcedo, H., Fenton, M. B., Hickey, M. B. C. and Blake, R. W.
Energetic consequences of flight speeds of foraging red and hoary bats (*Lasiurus borealis* and *Lasiurus cinereus*; Chiroptera: Vespertilionidae) 2245–2251

McCarthy, B. J. and Macmillan, D. L.
The role of the muscle receptor organ in the control of abdominal extension in the crayfish *Cherax destructor* 2253–2259

Mackie, G. O. and Meech, R. W.
Central circuitry in the jellyfish *Aglantha digitale*. I. The relay system 2261–2270

Mackie, G. O. and Meech, R. W.
Central circuitry in the jellyfish *Aglantha digitale*. II. The ring giant and carrier systems 2271–2278

Gonzalez-Cabrera, P. J., Dowd, F., Pedibhotla, V. K., Rosario, R., Stanley-Samuelson, D. and Petzel, D.
Enhanced hypo-osmoregulation induced by warm-acclimation in antarctic fish is mediated by increased gill and kidney Na^+/K^+-ATPase activities 2279–2291

McHenry, M. J., Pell, C. A. and Long, J. H., Jr
Mechanical control of swimming speed: stiffness and axial wave form in undulating fish models 2293–2305

Signore, P. E. and Jones, D. R.
Effect of pharmacological blockade on cardiovascular responses to voluntary and forced diving in muskrats 2307–2315

Dehnhardt, G. and Kaminski, A.
Sensitivity of the mystacial vibrissae of harbour seals (*Phoca vitulina*) for size differences of actively touched objects 2317–2323

Messer, A. C. and Brown, M. R.
Non-linear dynamics of neurochemical modulation of mosquito oviduct and hindgut contractions 2325–2336

Fieber, L. A.
Characterization and modulation of Na^+ and Ca^{2+} currents underlying the action potential in bag cells of *Aplysia* 2337–2347

Brown, R. E., Kovacs, C. E., Butler, J. P., Wang, N., Lehr, J. and Banzett, R. B.
The avian lung: is there an aerodynamic expiratory valve? 2349–2357

Smith, N. F., Eddy, F. B. and Talbot, C.
Effect of dietary salt load on transepithelial Na^+ exchange in freshwater rainbow trout (*Oncorhynchus mykiss*) 2359–2364

Kaunzinger, I. and Kramer, B.
Electrosensory stimulus-intensity thresholds in the weakly electric knifefish *Eigenmannia*: reduced sensitivity at harmonics of its own organ discharge 2365–2372

May, M. L.
Simultaneous control of head and thoracic temperature by the green darner dragonfly *Anax junius* (Odonata: Aeshnidae) 2373–2384

May, M. L.
Dependence of flight behavior and heat production on air temperature in the green darner dragonfly *Anax junius* (Odonata: Aeshnidae) 2385–2392

Airaksinen, S. and Nikinmaa, M.
Effect of haemoglobin concentration on the oxygen affinity of intact lamprey erythrocytes 2393–2396

Newland, P. L., Watkins, B., Emptage, N. J. and Nagayama, T.
The structure, response properties and development of a hair plate on the mesothoracic leg of the locust 2397–2404

Karila, P. and Holmgren, S.
Enteric reflexes and nitric oxide in the fish intestine 2405–2411

el-Wadawi, R. and Bowler, K.
The development of thermotolerance protects blowfly flight muscle mitochondrial function from heat damage 2413–2421

Review

Nikinmaa, M., Airaksinen, S. and Virrki, L. V.
Haemoglobin function in intact lamprey erythrocytes: interactions with membrane function in the regulation of gas transport and acid–base balance 2423–2430

Christie, A. E., Skiebe, P. and Marder, E.
Matrix of neuromodulators in neurosecretory structures of the crab *Cancer borealis* 2431–2439

Full, R. J., Yamauchi, A. and Jindrich, D. L.
Maximum single leg force production: cockroaches righting on photoelastic gelatin 2441–2452

Wallis, E. J., Paul, D. H., Antonsen, B. L. and Hollenberg, R.
Variations on a segmental theme: muscle receptor organs and extensor neuromusculature in the squat lobster *Munida quadrispina* (Anomura, Galatheidae) 2453–2463

Hastings, D. and Burggren, W.
Developmental changes in oxygen consumption regulation in larvae of the South African clawed frog *Xenopus laevis* 2465–2475

Ritter, D.
Epaxial muscle function during locomotion in a lizard (*Varanus salvator*) and the proposal of a key innovation in the vertebrate axial musculoskeletal system 2477–2490

Layland, J., Young, I. S. and Altringham, J. D.
The length dependence of work production in rat papillary muscles *in vitro* 2491–2499

Crockford, T., Johnston, I. A. and McAndrew, B. J.
Functionally significant allelic variation in myosin light chain composition in a tropical cichlid 2501–2508

Axelsson, M. and Franklin, C. E.
The role of the pericardium and the effects of adrenaline and changes in oxygen tension on the performance of an *in situ* perfused crocodile heart 2509–2518

Elphick, M. R., Newman, S. J. and Thorndyke, M. C.
Distribution and action of SALMFamide neuropeptides in the starfish *Asterias rubens* 2519–2525

Nässel, D. R., Kim, M.-Y. and Lundquist, C. T.
Several forms of callitachykinins are distributed in the central nervous system and intestine of the blowfly *Calliphora vomitoria* 2527–2536

Pernberg, J. and Machemer, H.
Voltage-dependence of ciliary activity in the ciliate *Didinium nasutum* 2537–2545

McGaw, I. J., Wilkens, J. L., McMahon, B. R. and Airriess, C. N.
Crustacean cardioexcitatory peptides may inhibit the heart *in vivo* 2547–2550

Wharton, D. A. and Ramløv, H.
Differential scanning calorimetry studies on the cysts of the potato-cyst nematode *Globodera rostochiensis* during freezing and melting 2551–2555

Greco, A. M., Gilmour, K. M., Fenwick, J. C. and Perry, S. F.
The effects of softwater acclimation on respiratory gas transfer in the rainbow trout *Oncorhynchus mykiss* 2557–2567

Raymond, J. A.
Glycerol synthesis in the rainbow smelt *Osmerus mordax* 2569–2573

Johansson, D. and Nilsson, G. E.
Roles of energy status, K_{ATP} channels and channel arrest in fish brain K^+ gradient dissipation during anoxia 2575–2580

Deliagina, T. G., Ullén, F., Gonzalez, M.-J., Ehrsson, H., Orlovsky, G. N. and Grillner, S.
Initiation of locomotion by lateral line photoreceptors in lamprey: behavioural and neurophysiological studies 2581–2591

Forrest, T. G., Farris, H. E. and Hoy, R. R.
Ultrasound acoustic startle response in scarab beetles 2593–2598

Bader, A. L., Parthasarathy, R. and Harvey, W. R.
A novel proline, glycine: K^+ symporter in midgut brush-border membrane vesicles from larval *Manduca sexta* 2599–2607

Pietrantonio, P. V. and Gill, S. S.
Immunolocalization of the 17 kDa vacuolar H^+-ATPase subunit c in *Heliothis virescens* midgut and Malpighian tubules with an anti-peptide antibody 2609–2618

Sullivan, G. V., Fryer, J. N. and Perry, S. F.
Immunolocalization of proton pumps (H^+-ATPase) in pavement cells of rainbow trout gill 2619–2629

Reed, C. M.
Dye coupling in the muscles controlling squid chromatophore expansion 2631–2634

Goldstein, L. and Davis-Amaral, E. M., Blum, P. C. and Luer, C. A.
The role of anion channels in osmotically activated taurine release from embryonic skate (*Raja eglanteria*) heart 2635–2637

Index of Authors 2639–2647

Index of Subjects 2649–2682